

Occupational Noise Exposure

29 CFR 1910.95



Is There a Problem?

- More than 30 million Americans are exposed to hazardous sound levels on a regular basis
- 10 million have suffered irreversible noise induced hearing loss
- Rate of hearing loss is increasing in the U.S.

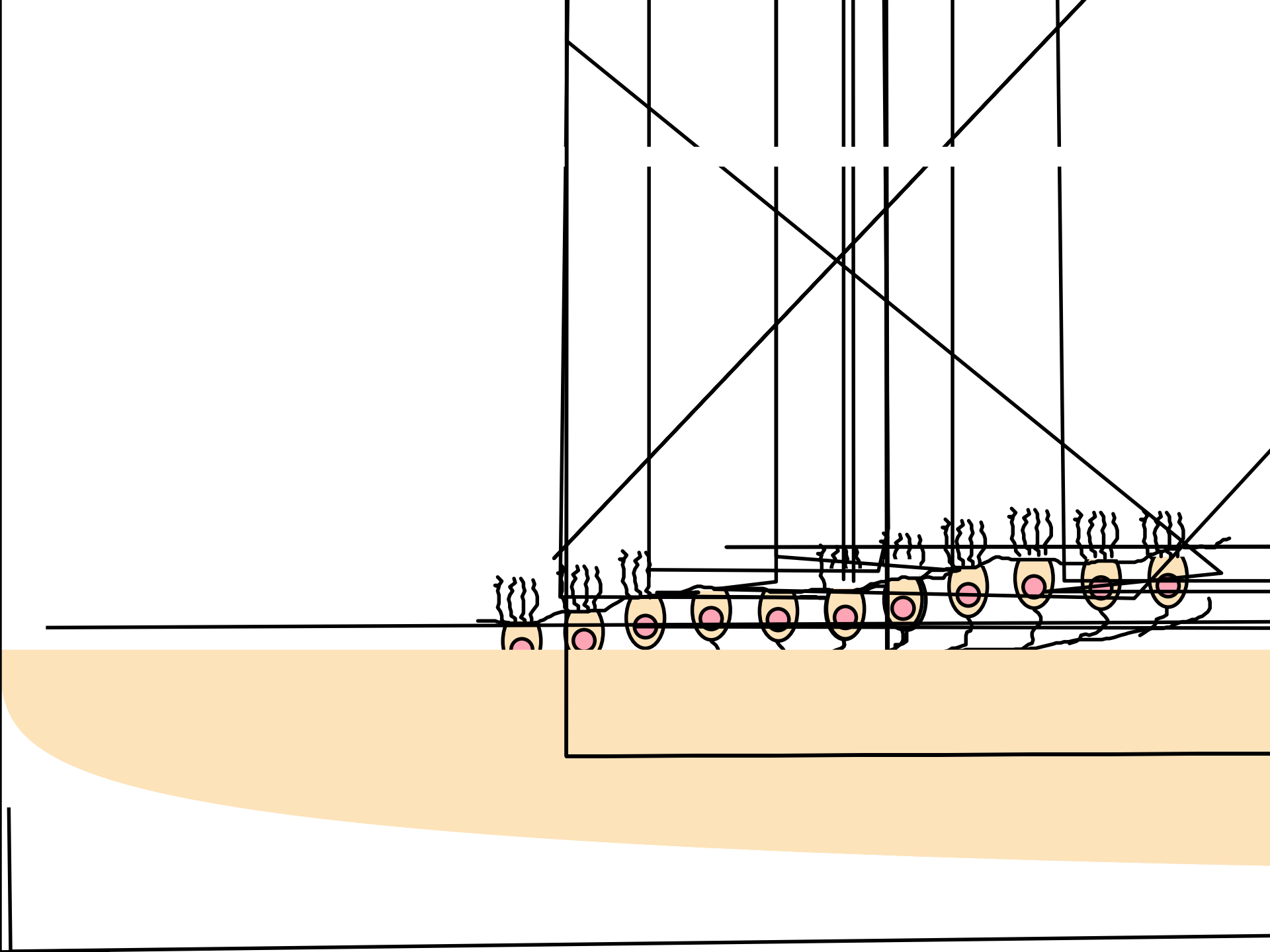
Good Hearing is Important

- Work sites can be dangerous
- What sound on a worksite alerts you to danger?
 - back up alarms
 - vehicle traffic
 - changes in equipment noise
 - verbal warnings from other workers



The Ear is a Delicate Tool





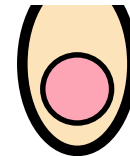
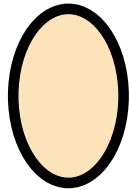
SENSORI-NEURAL HEARING LOSS

Noise-induced hearing loss

Damages the hair cells or auditory nerves

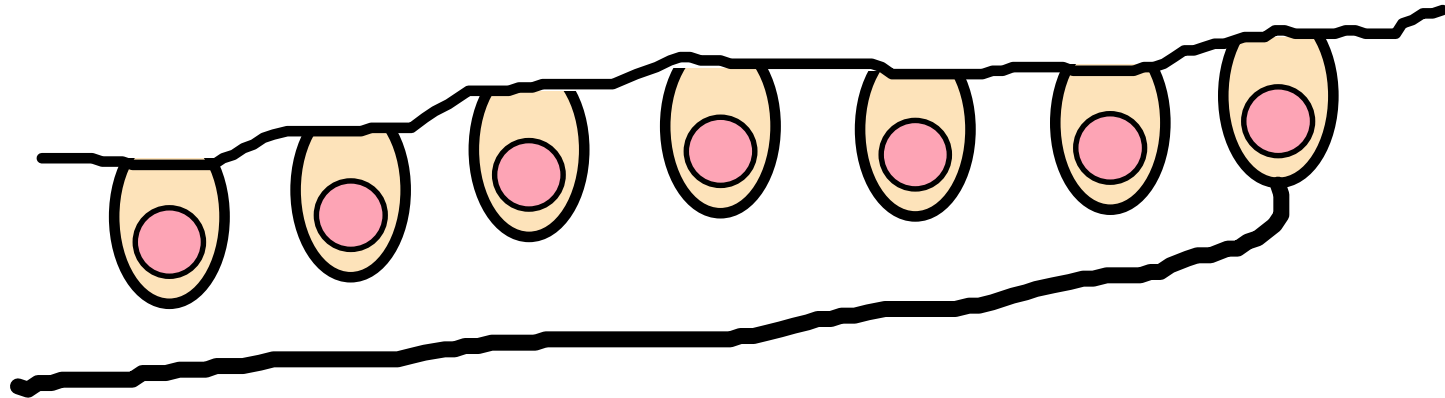
If the noise is stopped hair cells can bounce back

Damage can be temporary



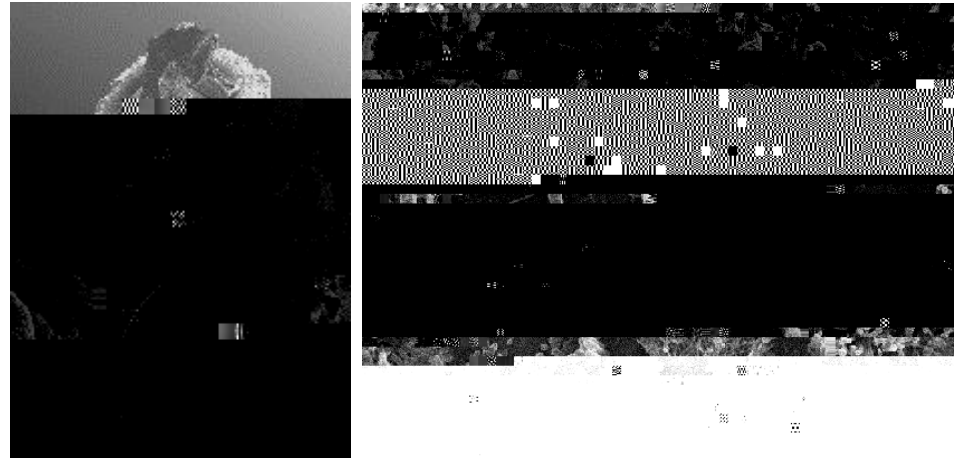
SENSORI-NEURAL HEARING LOSS

If the noise continues hair cells can't bounce back
Damage can be permanent!



Inner Ear

- Cochlea
 - inside are nerve cells called hair cells
 - fragile
- Continuous noise
 - above 90 dBA
 - as bad for hair cells as continuous foot traffic is to grass





This is your ear.



This is your ear on noise.

Any Questions?

What is Noise?

- Noise is a physical energy that moves through the air like ripples in a pond
 - noise is directional
 - noise will bounce off walls and other objects

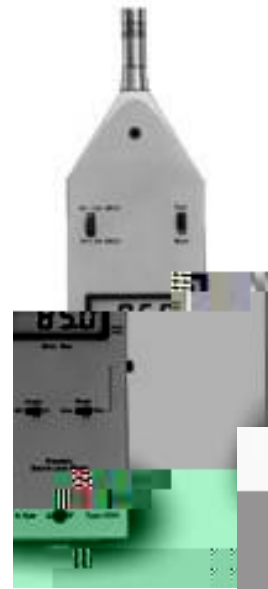


Two Components of Noise

- Frequency
 - perceived as “pitch”
 - measured in hertz (Hz)
 - human ear most sensitive in the 1,000 to 4,000 range
 - speech frequency ranges
- Intensity
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How is Noise Measured?

- Sound level meter
 - instant noise readings
 - generally A scale used
 - mimics the human ear
- Noise dosimeter
 - measure a workers noise exposure over a shift
 - daily dose of noise
 - very accurate



Units of Measurement for Noise

- Decibel dB
 - *little increases on the decibel scale make a big difference*
 - a 6 decibel increase in noise is equal to doubling the intensity or loudness of the noise
- Ear protection needed
 - noise above 90 dBA
 - recommended at 85 dBA

Examples of Noise Levels

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Noisy Hobbies

- Guns
 - large caliber short

Noise In The Workplace

- Examples at Work

- lawn mower - 95 dBA
- Leaf blower - 110 dBA
- Chainsaw - 115 dBA
- power actuated nail gun - 94 - 117 dBA
- pneumatic hand held grinder - 101 dBA
- air hammer - 105 - 130 dBA
- snowplow 87 - 97 dBA
- portable saw - 105 dBA
- air wrench -107 dBA
- arc welder - 116 dBA

Communication In Noisy Environments

- Hard to hear someone talking in noisy environments
 - the speaker needs to be louder than background noise
- Radios or cell phones will need to be turned up
 - if you have a hearing loss, it will be harder to distinguish speech in this environment

How Do You Know You Are Exposed to Damaging Noise

- Feel the need to shout in order to be heard 3 feet away
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How Much Noise Can You Be Exposed To?

- OSHA rules

What is a TWA?

- This is a daily “dose” of noise not a single exposure to a noisy piece of equipment
- Your daily dose of noise (TWA) is a function of:
 - how loud the equipment is (intensity)
 - how close you are to the noise
 - how long you are exposed to the noise

Main Causes of Hearing Loss

- Heredity
- Infections
- Acoustic trauma
- Prescription drugs
- Presbycusis

Types of Hearing Loss

- 2 Basic Types of Hearing Loss
 - Conductive
 - A hearing problem involving the outer ear or middle ear
 - Sensori-neural
 - A hearing problem involving the inner ear
- Mixed hearing loss
 - A problem involving the outer, middle and inner ear is a mixed hearing loss

Conductive Hearing Loss

Causes:

middle ear infections,
collection of fluid in the middle ear
blockage of the outer ear (by wax),
damage to the eardrum by infection or trauma,
otosclerosis, a condition in which the ossicles
of the middle ear become immobile because of
growth of the surrounding bone,
rarely, rheumatoid arthritis affects the joints
between the ossicles.

Sensori-neural Hearing Loss

Sensori-neural hearing loss:

age-related hearing loss,

Tinnitus

- Hearing loss may not be silent
 - Persistent (often or all the time)
 - Ringing, roaring, clicking or hissing sound
 - 12 million Americans have Tinnitus
 - should be evaluated by a Dr.
 - smoking, alcohol & IBTe by a Dr.

In Addition to Hearing Loss....

- Exposure to noise can....
 - Cause increased fatigue
 - headaches
 - increase the heart rate and blood pressure
 - cause muscles to become tense
 - cause indigestion
 - can lead to impaired balance
 - make it more difficult to hear audible warning devices

Noise Induced Hearing Loss

- Entirely preventable

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Audiometric (Hearing) Testing

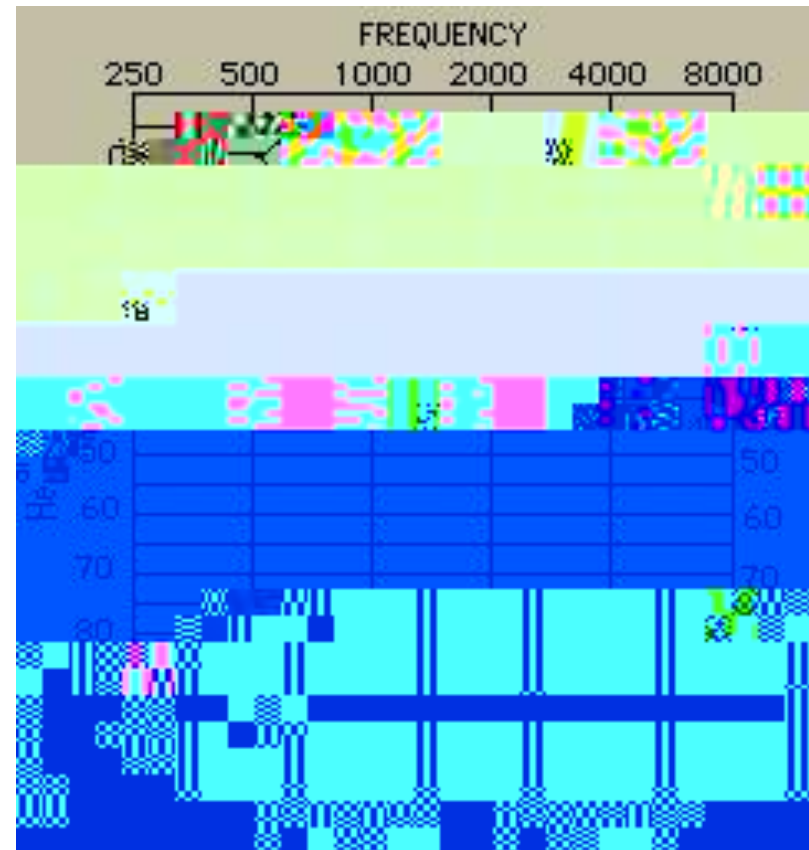
- Required annually for those employees enrolled in a hearing conservation program
 - identifies anyone with a change in hearing
 - this is just a “screening test” and should not be used to diagnose the type or extent of hearing loss
 - testing helps determine the effectiveness of an employers hearing conservation program

Audiograms

Computer generated “tape” showing normal hearing



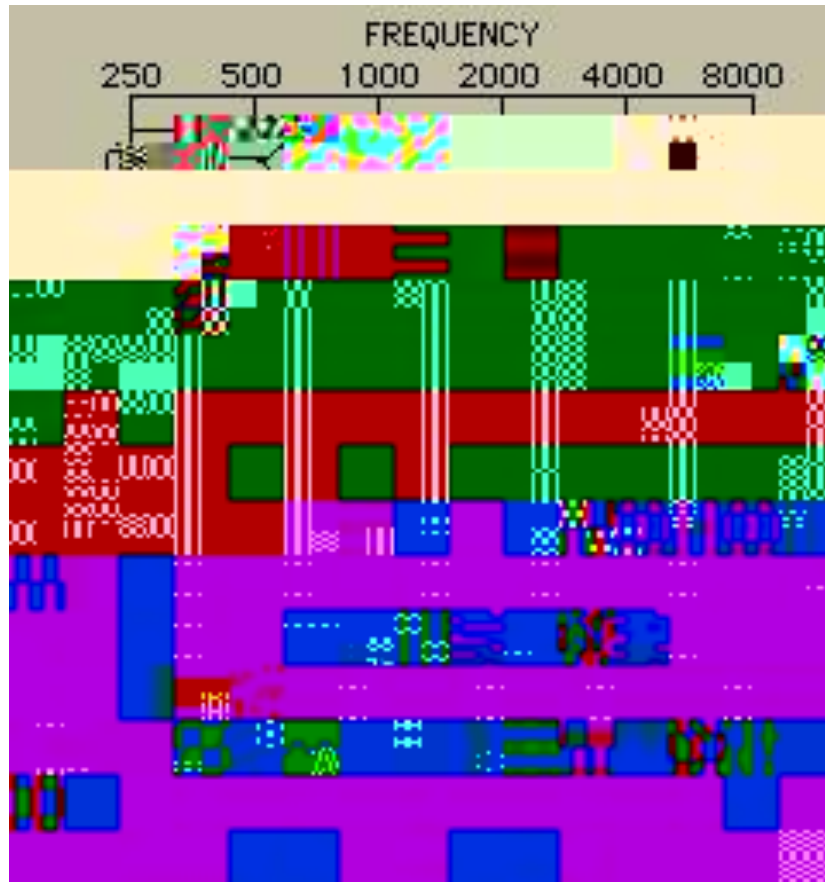
Computer generated graph of normal hearing



Degrees of Hearing Loss

- Normal 10 - 25 dB
- Mild 30 - 45 dB

Example of hearing loss



- Have you had a STS?
 - an average shift of greater than or equal to 10 dB at 2000, 3000, 4000 Hz
 - calculated by
 - comparing your baseline test with your present hearing level

Poor Hearing Test Results?

The following can result in a bad test result:

- exposure to noise without hearing protection before the test
- failure to follow the technicians instructions
- fatigue
- substance abuse
- Tinnitus
- pseudohypacusis (faking it)

Prevention of Further Hearing Loss at Work

- *Identify noise hazardous equipment*
- Put distance between you and the noise source
- *Limit the amount of time you are exposed*
- Modify the noise source so it is quieter
- *Use hearing protection when around loud noise*

PREVENTION

PREVENTION:

Limit the amount of time you are exposed:

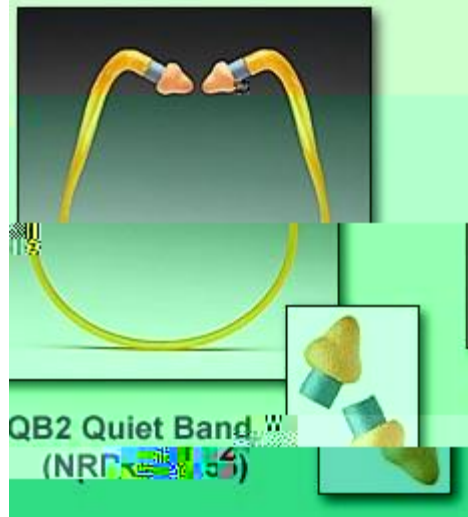
- Schedule noise activities for fewest workers needed for the job
- Take breaks away from the noise hazardous area
- Limit the amount of time employees are exposed to noise

PREVENTION

- It is common for less

HPD used - canal caps & ear muffs

- Canal Caps



- Ear Muffs



Noise Reduction Rating

- All hearing protection devices have a NRR assigned
- NRR's do not accurately reflect attenuation in the real world
- Field testing indicates.....
 - NRR is approximately half of what is listed for earplugs
 - NRR is approximately 75% of what is listed for earmuffs

NRR's - Good Rule of Thumb

- Take the NRR on the package and divide

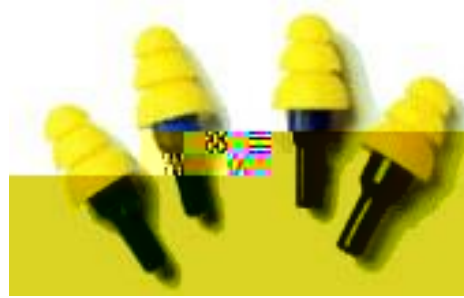
NRR the myth

Bigger is not necessary better

- Large NRR may not be appropriate if
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Flat Attenuating Devices

- Good for
 - noise exposures averaging 85 - 95 dBA as a TWA
 - environments where the spoken word needs to be heard
 - those employees with a hearing impairment



**EAR
UltraTech**



Hearing Aids are not hearing protection

- Hearing aids do not block out enough sound for most occupational exposures to noise
- When hearing aid users are exposed to harmful levels of noise they should
 - remove their hearing aids and use hearing protection or
 - turn off their hearing aids and put ear muffs on over them

The bottom line.....

- Your ears are a delicate tool - if your working with broken equipment you need to address your exposure by...
 - getting further evaluation from an audiologist; otogaryngologist; physician
 - choosing hearing protection that is right for you
 - asking for your employers help in evaluating your working environment and making changes to reduce your exposure